HAZE-FREE BST FILMS

Abstract of the Disclosure

Described herein is a method for producing a haze-free (Ba, Sr)TiO_3 (BST) film, and devices incorporating the same. In one embodiment, the BST film is made haze-free by depositing the film with a substantially uniform desired crystal orientation, for example, (100), preferably by forming the film by metal-organic chemical vapor deposition at a temperature greater than about 580°C at a rate of less than about 80 Å/min, to result in a film having about 50 to 53.5 atomic percent titanium. In another embodiment, where the BST film serves as a capacitor for a DRAM memory cell, a desired {100} orientation is induced by depositing the bottom electrode over a nucleation layer of NiO, which gives the bottom electrode a preferential {100} orientation. BST is then grown over the {100} oriented bottom electrode also with a {100} orientation. A nucleation layer of materials such as Ti, Nb and Mn can also be provided over the bottom electrode and beneath the BST film to induce smooth, haze-free BST growth. Haze-free BST film can also be favored by forming the bottom electrode at high temperatures close to those used for BST deposition, and without a vacuum break between the bottom electrode and BST deposition.

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